

# **ELECTRONIC WARFARE**

## **ESM and ECM over the battlefield**



**MÜCKE -**

**Modular Electronic Countermeasures**



**FLEDERMAUS -**

**Modular Electronic Support Measures**

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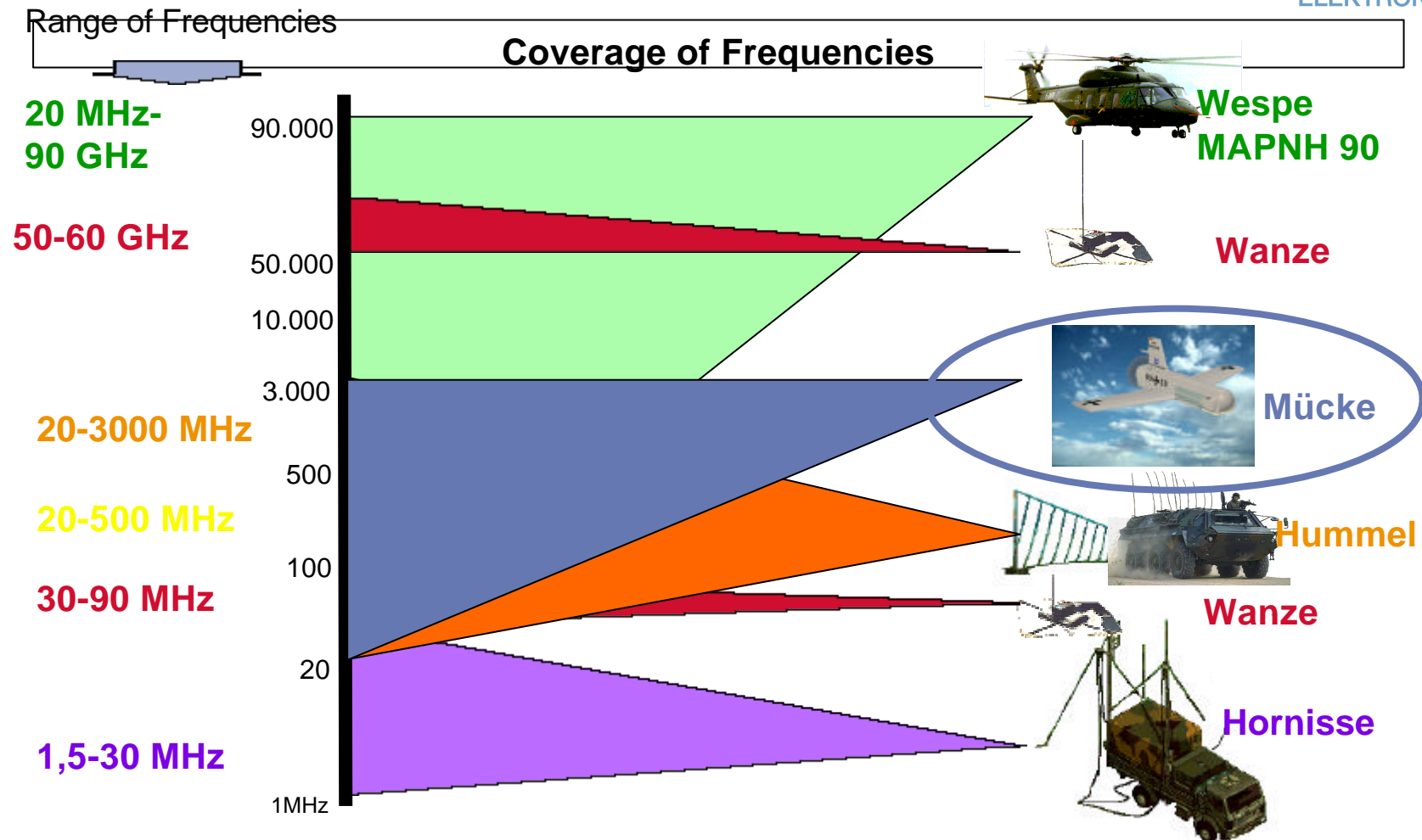
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# MÜCKE

## Supplimenting Capabilities for EW



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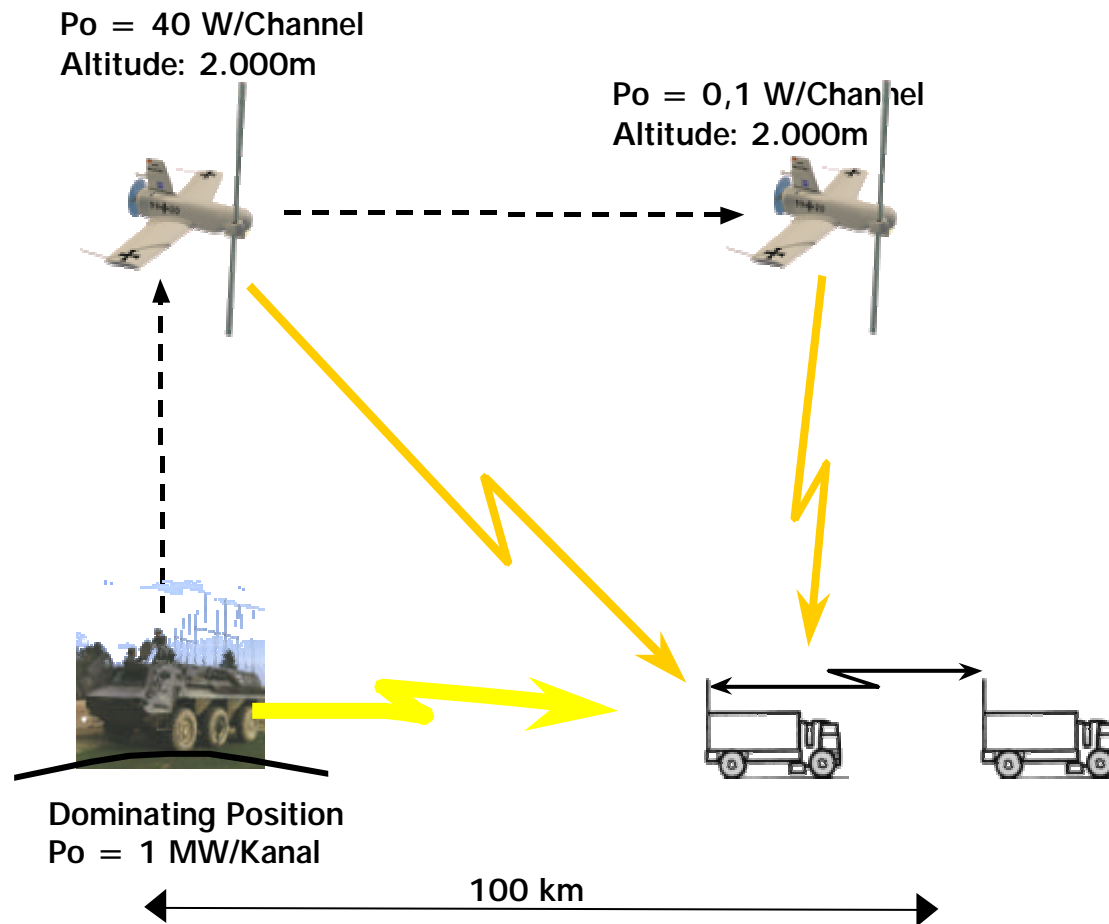
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# MÜCKE

## System Feature

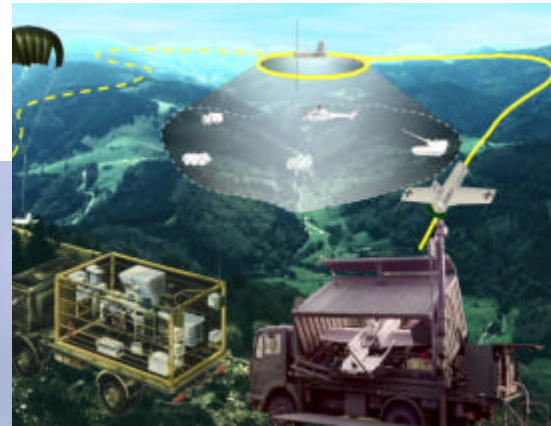


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# MÜCKE - Broadband ECM System

## Tasks



### Jamming of

- VHF - Communications
- UHF - Communications

### Future Applications

- Jamming of COM-Networks
- Jamming of point-to-point Communications and Radar
- Navigation Warfare

# MÜCKE

## System Elements



*6 (+ 6) Air Vehicle  
MÜCKE*



*2 HF Data-Link MÜCKE*



*2 EW-Ground  
Control MÜCKE*



*2 Launch Vehicle  
KZO*



*2 Recovery  
Vehicle KZO*



*2 Maintenance  
Vehicle KZO*



*2 Ground Control  
Station KZO*



# MÜCKE

## Air Vehicle

## Functional Demonstrator (Target System)



<b>AV weight:</b>	<b>160 kg, (190 kg)</b>
<b>Propulsion:</b>	<b>2-Takt 2 Zyl. F+S Motor, (TKDI 600 - Heavy Fuel))</b>
<b>Stand Off:</b>	<b>up to 150 km</b>
<b>Speed:</b>	<b>Cruising: 200 km/h Jamming: 180 km/h</b>
<b>Payload:</b>	<b>VHF 20 - 110 MHz UHF 100 - 500 MHz</b>
<b>Endurance:</b>	<b>(5 h)</b>



# MÜCKE

## EW-Control Station



- **Planning, Simulation und Control of Jamming Missions**
- **2 Workstation**  
**EW-Planning and Flight Control**
- **Online Simulation of the Jamming Effectiveness**
- **C4I-Interface**
- **Optical Interface to the Data Link and the GCS KZO**
- **Shelter Fm II B on 5to-Truck**





# FLEDERMAUS

## Tasks



**COMESM and SIGINT for communication- and radar-systems with stand-off capability. Increasing the effectiveness in the mission area**

- Electronic Order of Battle
- Support of weapon systems
  - Guidance and control of EW-Systems
  - Location of target areas
- Direct Warning of own troops
- Assign of IMINT-Sensors

### **Mission Type**

- Wide Area Interception of all electromagnetic emissions
- Selected interception for specific areas- and frequencies
- (Effectiveness-) Surveillance for selected emitter

# FLEDERMAUS

## System Concept



*6 (+ 6) Air Vehicle  
FLEDERMAUS*



*2 Data-Link FLEDERMAUS (KZO)*



*2 EW-Ground  
Control  
FLEDERMAUS*



*2 Launch Vehicle  
KZO*



*2 Recovery  
Vehicle KZO*



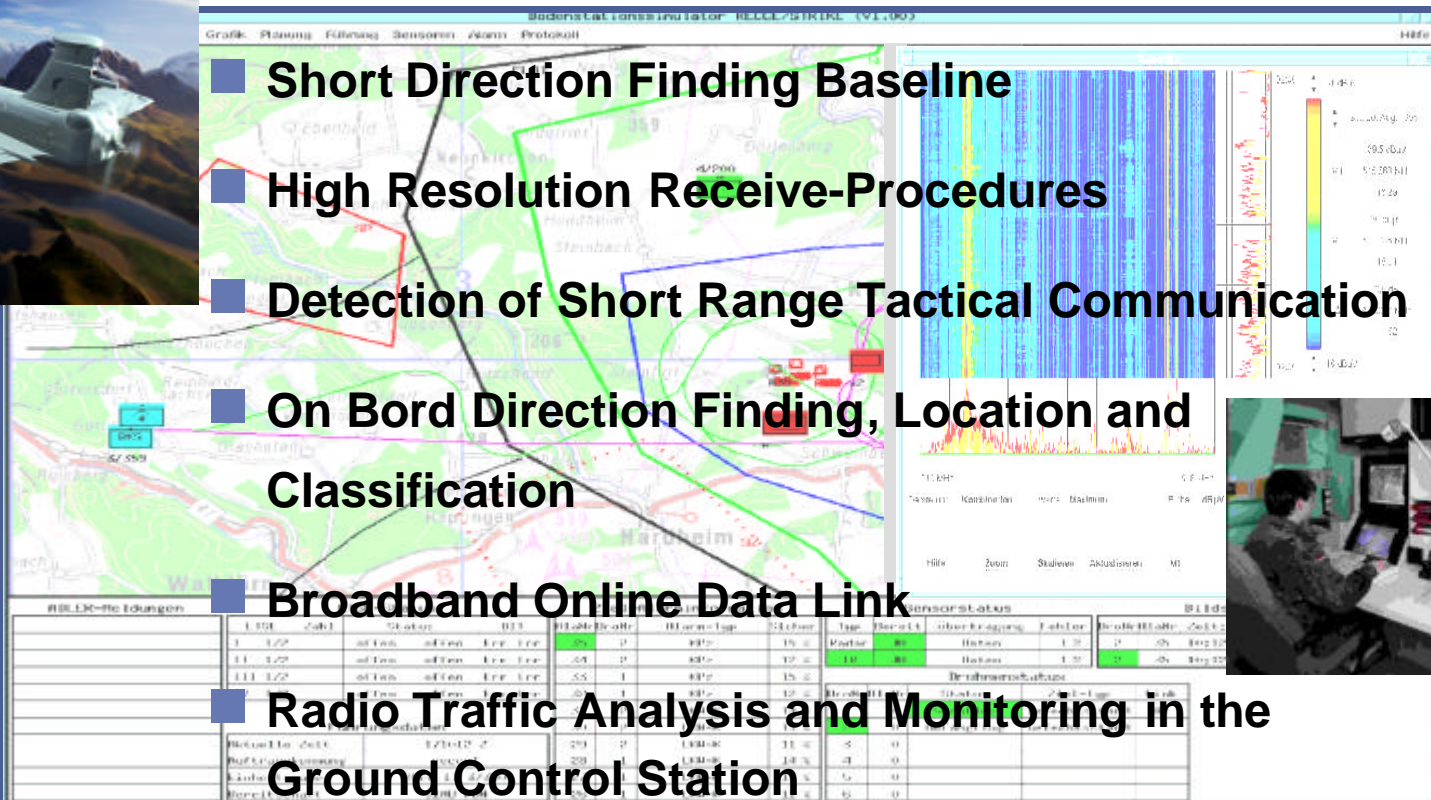
*2 Maintenance  
Vehicle KZO*

# FLEDERMAUS

## Technical Features



- Short Direction Finding Baseline
- High Resolution Receive-Procedures
- Detection of Short Range Tactical Communication
- On Bord Direction Finding, Location and Classification
- Broadband Online Data Link
- Radio Traffic Analysis and Monitoring in the Ground Control Station



# FLEDERMAUS

## Air Vehicle Characteristics

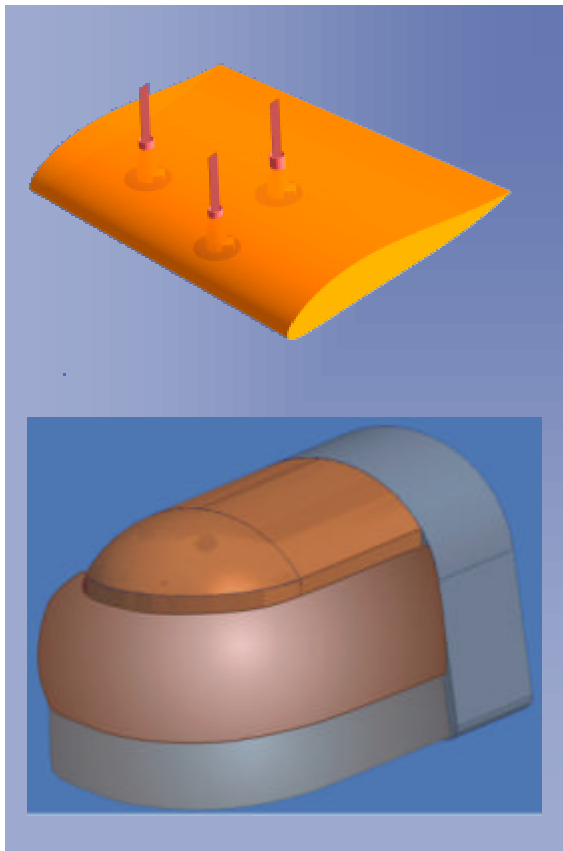


<b>Range:</b>	<b>up to 180 km</b>
<b>Flight duration:</b>	<b>5 hours</b>
<b>Flight altitude during mission:</b>	<b>300 - 4000 m (typ. 2500m)</b>
<b>Operational ceiling:</b>	<b>4.500 m</b>
<b>In-flight speed:</b>	<b>120 - 220 km/h</b>
<b>Flight profile :</b>	<b>preprogrammed and / or reprogrammable in flight</b>
<b>Payload</b>	<b>up to 50 kg</b>

<b>Wing span</b>	<b>3,42 m</b>
<b>Length start</b>	<b>3,05 m (with booster)</b>
<b>In-flight</b>	<b>2,25 m</b>
<b>Height</b>	<b>0,96 m</b>
<b>Take of weight</b>	<b>190 kg</b>

# FLEDERMAUS

## Main Topics of the Study 2000/01



**Development of the antenna concept for the frequency range from 20 MHz up to 2 GHz. Prototyping of the antenna system.**

Separation of the frequency band into 3 subarrays

Investigation of the application „High Resolution Procedures“

**Investigations concerning the acquisition- and processing unit. Prototyping of the acquisition- and processing unit**

IT-System

Direction finding / location

Emitterlibrary

Data reduction / compression

**Investigations concerning the airborne platform and prototyping of the experimental system**

Payload Integration

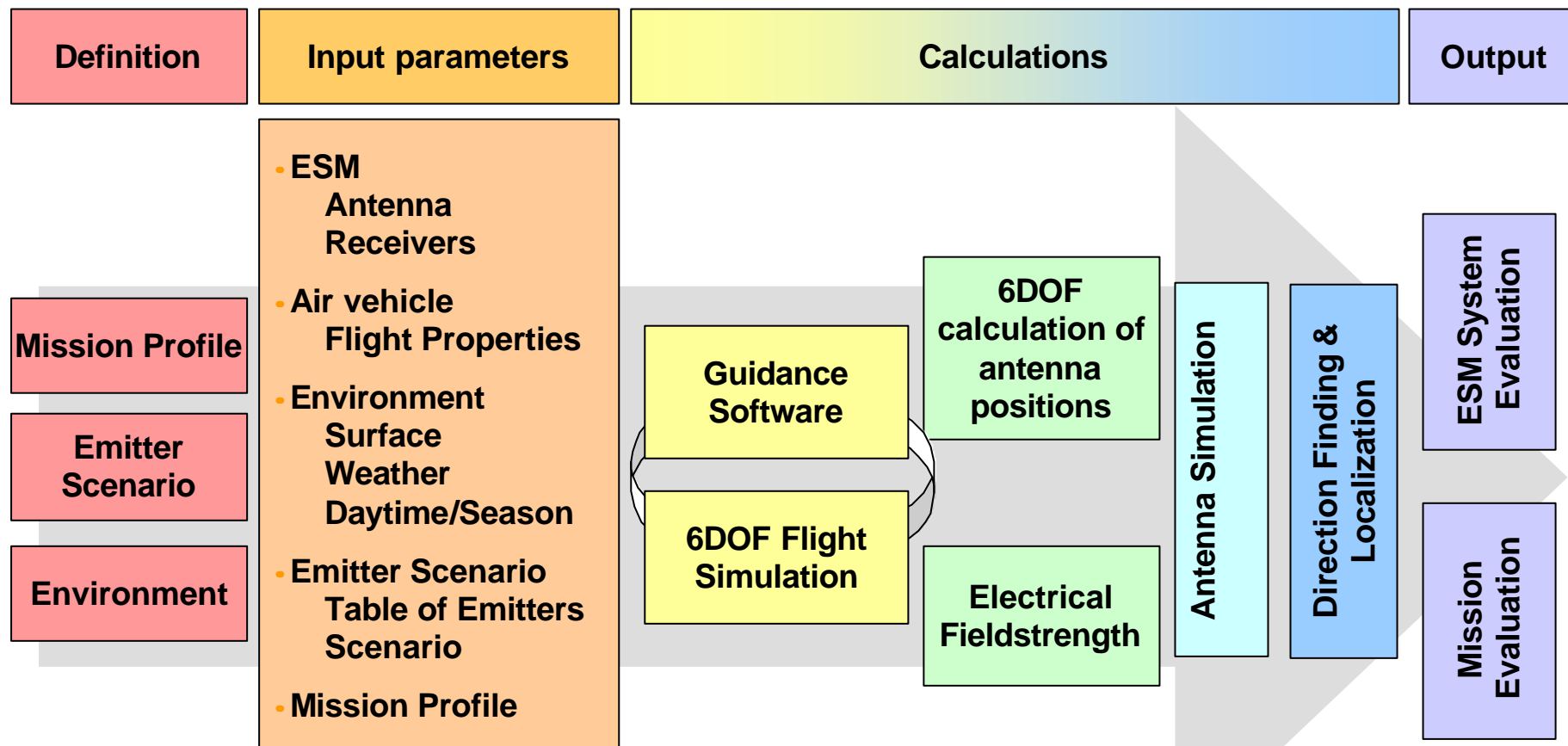
Flight Performance

Environment and LCC based on MÜCKE

Using the HPM-Testdrone

# FLEDERMAUS

## System Simulation





# FLEDERMAUS

## Experimental System

Field trials with the experimental system at the testrange in  
Greding - WTD 81



# FLEDERMAUS

## Experimental System

Field trials with the experimental system at the testrange in  
Oberjettenberg - WTD52

